

PLANNING PROCESS/PLAN ADOPTION

The Schoharie County Planning and Development Agency lead in the development of this plan. Shane Nickle, Senior Planner and County Hazard Mitigation Coordinator, led in the development of the plan at the staff level. Brian Fleury, Planner, led in the development of maps and property analysis. Two interns, Michael Sellers and Terry Rowe, made many contacts for risk assessment work. Although Schoharie County has been working on flood hazard mitigation since early 1996, the official kickoff for development of this multi-jurisdictional all-hazard mitigation plan occurred on June 24, 2003 with a dinner meeting held at the Holiday Inn Express in Schoharie, New York. The purpose of the dinner was to introduce the mitigation concept, describe past efforts in the County and to get all possible participants on the same page for the multi-jurisdictional planning process. Key players from several organizations and representatives from each municipality in the County were invited. The dinner was well attended with 61 people. 31 people attended representing each of the 22 municipalities (16 towns and 6 villages) in the County and 30 agency people attended representing involved County agencies and participants/plan reviewers including SUNY-Cobleskill, Bassett Hospital, Schoharie County Board of Supervisors, Schoharie County Farm Bureau, Schoharie County Community Action Program (SCCAP), NY Power Authority (NYPA), NY State Emergency Management Office (NYSEMO), National Weather Service (NWS), and the NY State Police.

Based on interest generated at the meeting, Schoharie County formed a hazard mitigation planning team in August 2003 made up of the following members:

Bassett Hospital:	Janet Gordon	County Board Chair:	Earl Van Wormer III
Chamber of Commerce:	James Batsford	County Planning:	Shane Nickle
SCCAP:	Barbara Rivenburg	DPW:	Thomas Fagnani
County Health:	Carl Stefanik	NYPA:	Steve Ramsey
County Sheriff:	John Bates	SEMO Region III:	Robert Bacarri
EMO:	Judy Cary	County Soil/Water:	Steve Hoerz
EMS:	William Averill	SUNY Cobleskill:	David Schindler
Farm Bureau:	Donna Burr	One representative from each of the municipalities	
Fire Coordinator:	Charlie Stanton		

A workshop with the Committee and NYSEMO staff was held on September 4, 2003 to go over the planning process in more detail. Meetings of the committee are held monthly in conjunction with the County Emergency Planning Committee monthly meeting. A meeting summary is listed in Appendix D. Risk analysis through January 2004 was based, in part, by a County HAZNY review in 1999 and an updated HAZNY review on December 12, 2003. Key representatives participated in the HAZNY process or were contacted for input. It was found that each municipality essentially is at risk from the same hazards even though the priority of the threat may differ. A breakdown of hazard risk for each municipality was completed in 2005. The Schoharie County Hazard Mitigation Committee was formed in September 2003 and was officially appointed by a resolution of the Schoharie County Board of Supervisors in April 2004. Based on the need to streamline the ongoing process and the need for a committee to continue meeting for plan adoption, plan implementation and plan review, the resolution determined that the mitigation committee would consist of key members and a representative from each municipality would be expected to report to their town/village board. A copy of the resolution can be found in Appendix C. The new County Safety Coordinator participates in meetings with the Committee and will be formally added to the committee.

Each municipality selected representatives as contacts for the hazard mitigation committee and was contacted for information and received draft copies of the plan for comment. Town boards/planning

boards and village boards of trustees/planning boards also participated in plan development and review. As of May 2006, the municipal representatives are as follows:

Municipality	Representative(s)
Town of Broome	James Chichester/Marie Campbell
Village of Richmondville	Joe Furnell/Kevin Neary
Town of Middleburgh	Joe Furnell/Dennis Richards
Village of Sharon Springs	Peter Irwin
Town of Sharon	Peter Irwin/Anthony Desmond
Town of Schoharie	Peter Irwin/Martin Shrederis
Town of Cobleskill	Peter Irwin/Michael Montario
Town of Summit	Carl Jackson/Harold Vroman
Village of Middleburgh	William McCabe
Town of Fulton	Joe Nelson/Phil Skowfoe
Village of Schoharie	Joe Nelson/John Borst
Village of Esperance	Joe Nelson/Steve Miller
Town of Carlisle	Michael Piccolo/Larry Bradt
Town of Richmondville	Michael Piccolo/Betsy Bernocco
Village of Cobleskill	Michael Piccolo/Michael Sellers
Town of Blenheim	Norwood Tompkins/Robert Mann
Town of Jefferson	Michael Schwarzkopf/Richard Kuhn
Town of Gilboa	Audrey Tompkins/Anthony VanGlad
Town of Conesville	Ken Nolte/Donald Brandow
Town of Wright	Earl Van Wormer III/Susan Loden
Town of Esperance	Jerry Weis/Earl Van Wormer III
Town of Seward	Jerry Weis/Larry Phillips

Representatives were contacted throughout the development of this plan and worked with a municipal team of representatives including local fire chiefs, highway superintendents, planning board members, or other officials from the municipality. All 22 municipalities participated in the planning process and reviewed and commented on the plan. The Village of Cobleskill, the most populous village in the County (4,533 people), was heavily involved with meetings and correspondence. The public was engaged through the use of posting the plan online, newspaper articles in the Times Journal and Mountain Eagle, legal notices in the Times Journal and Mountain Eagle, and a posted announcement at each municipal office in the County (See Appendix E). County Planning and Development staff and EMO staff have also discussed mitigation issues at several special meetings since 1996 and at several town/village board meetings. Response from the public focused only on flooding issues.

Many experts were contacted for information and the name of the contact and/or source of information is cited within the plan itself. The National Weather Service provided many useful suggestions on the draft plan and their websites were utilized extensively. During the process, communities undergoing comprehensive planning projects (Town of Gilboa, Town of Richmondville, Village of Richmondville, and Village of Esperance) incorporated the hazard mitigation goals into their local plans. Incorporating the goals/actions of the hazard mitigation plan will become part of the adopting resolution for each municipality to help ensure implementation of the plan. Communities without comprehensive plans will be contacted annually by the Hazard Mitigation Committee to help achieve the goals and implement the actions. The Schoharie County Planning and Development Agency and Emergency Management Office provided and utilized information from several Federal and State reports and web sites for the development of this plan. Federal Emergency Management Agency materials (State and Local Mitigation Planning How-to Guides) were relied upon heavily for plan development. Other resources used include:

Schoharie County All-Hazards Mitigation Plan – May 2006

The Pipeline Group Midwest Emergency Response Manual
Blenheim-Gilboa Pumped Storage Project Emergency Action Plan in the Event of Dam Failure
Gilboa Dam of Schoharie Reservoir Emergency Action Plan – October 2001
Flood Damage Reduction Measures – Schoharie County, NY – March 2000
Flood Protection for your Community in New York State
Soil Survey of Schoharie County
Environmental Geology, Carla W. Montgomery
Earth Science, Edward Tarbuck
Susquehanna Guardian – Managing the Basin’s Groundwater
Comprehensive Plans – Town of Carlisle, Town of Esperance, Village of Esperance, Town of Wright,
Town/Village of Schoharie, Town of Middleburgh, Town of Broome, Town of Gilboa, Village of Sharon
Springs

Plan Adoption - Before final adoption of the plan, it will have been reviewed by: 6 Schoharie County villages, 16 Schoharie County towns, all fire departments in the County, Village of Cobleskill and Village of Schoharie Police, all main school districts in the County, SUNY Cobleskill, Bassett Hospital, New York Department of Environmental Conservation Bureau of Flood Protection, Army Corps of Engineers, National Weather Service, United States Geological Survey, New York Department of Transportation – Region 9, Citizens for Clean Environment, County Sheriff, County Emergency Services, County Fire Coordinator, County Safety Officer, County Emergency Management Office, County Planning Department, County Department of Public Works, County Health Department, County Office for the Aging, County Public Transportation, Canadian-Pacific Railroad, New York State Police, Natural Resource Conservation Service, County Soil and Water Conservation Service, Trout Unlimited, New York City Department of Environmental Protection, Pipeline Group Midwest, National Grid, New York State Electric and Gas, Richmondville Power & Light, MidTel, Verizon, Schoharie County Farm Bureau, Schoharie County Chamber of Commerce, State Emergency Management Agency, Federal Emergency Management Agency and the New York Power Authority. Upon adoption of the plan by the County, the above entities and other partners will be asked to sign a Memorandum of Agreement (Appendix B) to participate in hazard mitigation activities and help achieve the goals and objectives of the plan. This includes sending a representative to an annual meeting to work towards this initiative and striving to incorporate the plan requirements into other planning documents.

Adoption by local municipalities demonstrates the commitment of Schoharie County and each municipality to fulfilling the goals and objectives in the plan. Each municipality will proceed with adoption when FEMA provides conditional approval of the draft plan. Following adoption of the plan, each municipality will submit a copy of the resolution showing adoption of the plan to Schoharie County Planning and Development Agency, which will forward the copies to NYSEMO. Following adoption by a municipality, a supervisor or mayor will sign the signature page and Memorandum of Agreement (MOA), or similar MOA located in Appendix B. The Schoharie County Board of Supervisors will also formally adopt the plan before the Chair of the Board signs. Each adopting resolution will be placed in Appendix B. Prior to adoption, the completed plan will be available to the public online, each municipality will make a copy of the plan available to the public, ask for additional public comment, place a public notice in the legal paper, and receive input from the public at a properly advertised meeting. Once adoption has taken place, the signature page and resolution copies will be forwarded to NYSEMO and made a permanent part of the plan.

RISK ASSESSMENT

Hazard Identification

This plan is based on an assessment of the County's vulnerability to hazards performed by the Planning and Development Agency, Emergency Management Office, Hazard Mitigation Committee and meetings with municipal representatives. The following priority rankings were prepared based on the scope (area of impact and potential for cascade effect), frequency, impact, onset (warning time), and duration of each hazard considered using the HAZNY (Hazards New York) interactive spreadsheet program on January 21, 1999 and an update on December 12, 2003. Historic records and knowledge of past events were also used in determining the ranking. A ranking of hazards was completed in 2005 for each individual municipality and the breakdown is provided in the municipal summary section. The County will utilize HAZUS-MH and expects advancement in local GIS technology to greatly improve the risk assessment portion of the plan by the first review in 2010. A detailed inventory of floodplain structures is one of the main goals by the first review.

Schoharie County Hazard Analysis (Countywide)

Moderately High Hazards:

Flood
Dam Failure
Winter Storm (Severe)

Moderately Low Hazards:

Severe Storm
Terrorism
Oil Spill
Wildfire
Fire
Water Supply Contamination
Mine Collapse
Landslide
Hazardous Material (In Transit)
Transportation Accident
Tornado

Utility Failure
Ice Storm
Fuel Shortage
Explosion
Hazardous Material (Fixed Site)
Earthquake
Food Shortage
Extreme Temperatures
Radiological (In Transit)

Low Hazards:

Structural Collapse
Caving Accident
Ice Jam
Drought
Epidemic
Air Contamination

The following hazards were eliminated from consideration for the reason stated:

Tsunami/Wave Action	According to the National Weather Service (Philadelphia/Mount Holly), tsunamis have impacted the Atlantic Coast of the northeastern United States in the past. All tsunami/wave damage was confined to the immediate coast. Due to the geographic location of Schoharie County (approximately 150 miles inland from the Atlantic with a lowest point of 525 feet above sea level) the ability of a tsunami to impact Schoharie County is extremely remote, barring a catastrophic event in the Atlantic Ocean.
Radiological Fixed Site	There are three electricity generating nuclear power sites in New York State. Of the three, the Indian Point site located in Westchester County is the closest, located approximately 80 miles from the southern Schoharie County border. The other sites in the Towns of Scriba and Ontario along Lake Ontario are 100+ miles away. The Knolls Atomic Laboratory sites are located in Niskayuna, NY (approximately 15 miles) and the Town of Milton (approximately 20 miles). However, the Knolls sites are not large enough to impact Schoharie County and a major problem at any site is unlikely. The possibility is remote, but Schoharie County could be impacted by low levels of radiation in a major anomaly at one of the six electricity-generating plants. In such a case, considerable time would be available for any necessary actions.
Avalanche	Avalanches in New York State are mainly confined to the higher peaks of the Adirondacks. Any small avalanche that may occur in Schoharie County is likely to be of such small size and power that the damage would be negligible or easily handled by town/village resources.
Hurricane	Hurricane force winds and accompanying rain were not reviewed separately. The impacts were analyzed as Severe Storm.

Hazards Rated as Moderately High

FLOOD:

Potential Impact: Throughout a Large Region

Cascade Effects: Highly Likely

Frequency: A Frequent Event

Onset: Several Hours Warning

Hazard Duration: Two to Three Days

Recovery Time: More Than Two Weeks

Impact:

- Serious Injury or Death is Likely, but not in Large Numbers
- Moderate Damage to Private Property
- Moderate Structural Damage to Public Facilities

Definition: Flooding usually is a natural, cyclic occurrence in existing water bodies or drainage ways. When a water body overflows its “normal” banks, a potentially violent and/or destructive waterway can form. A flash flood is a sudden transformation of a small stream into a violent waterway after heavy rain and/or rapid snowmelt. Urban flooding occurs in developed areas where the drainage system is inadequate to safely convey runoff.

Profile/Vulnerability Assessment: Flooding can be caused by excessive precipitation, rapid snowmelt, ice jams, beaver dams, or dam failure. Urban or street flooding can result from heavy precipitation, clogged storm sewers, or a ruptured water main. Steep slopes make the area very prone to flash flooding. Slow-moving thunderstorms often produce flash floods, particularly during summer months. Remnants of tropical storm systems can produce both flash floods and river flooding. Rapid thawing in the winter produces runoff from snowmelt and ice jams. Flooding can occur at any time of year.

According to two separate HAZNY reviews, Schoharie County is at high risk for flood potential. HAZNY is a computer based hazard analysis program that analyzes and ranks potential hazards in a county or other municipality, on a scale from low to high.

According to the Flood Insurance Study used to create new 2004 FIRMs for Schoharie County, flooding is by far the most frequent and damaging disaster in Schoharie County. Floods can occur at anytime of the year, but the most significant floods are associated with snowmelt or combined precipitation-snowmelt events. The Schoharie Creek is the largest watershed in the County (entire area of 950 square miles) and most flood problems occur along the creek. Flowing north to the Mohawk River, the creek drains the northwestern Catskill Mountains. Schoharie Creek follows a meandering course, with low to moderate sinuosity and a varying bed gradient. Its tributaries are best characterized as having moderate to steep gradients, low sinuosity, and with high-relief contributory watersheds. A small area in the southwestern part of the County is drained by the Charlotte Creek, which flows into the drainage basin of the Susquehanna River to the west. Sparse development and no significant problems occur on the Charlotte Creek. In the eastern part of the County, a small area near the Hamlet of Franklinton in the Town of Broome is drained by the Catskill Creek that flows into the Hudson River.

The mean annual precipitation for the Schoharie Watershed is 40 inches. Runoff averages 20 inches per year, with more than 50 percent accruing between mid-February and mid-May. The two reservoir dam systems on the creek, Schoharie Reservoir and Blenheim-Gilboa, provide water to New York City and produce hydroelectric power, respectively. The Blenheim-Gilboa reservoir dam is located 4 miles north of the Schoharie Reservoir. The dams are not operated as flood control structures and all peak discharges are passed downstream to Schoharie Creek.

The most recent significant floods in the Schoharie Creek watershed of April 1987 and January 1996 were direct results of snowmelt or combined precipitation-snowmelt events. These floods occurred when unseasonably warm weather melted existing snow pack that was followed by intense rainfall.

An intense storm occurred on April 3-5, 1987. Soils were already saturated, stream discharges were high, and some reservoirs were at or near capacity from snowmelt and previous rainfall. In early March, due to unseasonably warm weather, a 30-inch snow pack had been reduced by nearly half. Rainfall from April 3 to April 6 resulted in more than 9 inches at higher elevations. The peak discharge on the Schoharie Creek reached 72,200 cfs at downstream gauges. Flooding on the Schoharie Creek resulted in the collapse of the New York State Thruway Bridge due to scour. Several deaths were caused as a result of the bridge collapse.

On January 18 and 19, 1996, extensive flooding was caused in the Schoharie Creek watershed when precipitation from a large storm combined with rapidly melting snow brought on by warm temperatures. Snow pack in the Catskills exceeded 45 inches and the January 18-19 storm provided 2.0 – 4.5 inches of rain, varying mainly by elevation. Air temperatures rose above 60 degrees F by midnight of January 19 and remained high for several hours. The January 1996 floods were the most widespread and devastating in Schoharie County since Hurricane Agnes in 1972. With a peak discharge exceeding 80,000 cfs at two downstream gauges, it is currently the flood of record in the Schoharie Creek watershed. Two deaths occurred in the Village of Schoharie and damage to residences, businesses, roads and bridges prompted a new outlook on floodplain management in the County. Over 40 homes were substantially damaged by floods and 2 people drowned in the Village of Schoharie. Damages from this event in Schoharie County exceeded \$1,500,000.00

Other major flood events in the County occurred in 1784, 1858, 1869, 1901, 1903, 1936, 1938, October 1955, October 1977, April 1983, November 1996, September 1999, and June 2000.

Of the 11 largest events of record, all but three were influenced by snowmelt events. Other significant events occurred when air temperatures and evapotranspiration rates were decreasing, causing a simultaneous and rapid increase in soil water content, and resulting in large stream discharges. Many localized events have caused drainage problems, ponding, streambank erosion, road damage, and other problems.

In 2001, storm water drainage problems in the Village of Sharon Springs resulted in flooding along US Route 20 resulting in approximately \$20,000 in property damages. Several businesses along Route 20 had to be closed during the event resulting in business losses.

The National Weather Service recorded "The Great Catskill Toilet Flush" in March 1980. Conditions included 10 inches of rain and nearly bare and frozen ground that led to rapidly developing and severe floods on Schoharie, Catskill, and Esopus creeks.

Table 5 shows high water flows since 1973 at the Blenheim-Gilboa Pumped Storage Power Plant. Minor floods occur in the floodplain of the Schoharie Creek when water flows are around 10,000 cubic feet per second (cfs). Major floods occur when flows exceed 20,000 cfs. Evacuation notices usually are issued at 14,000 cfs. It is important to note that other tributaries and storm water runoff adds significantly to creek water flow amounts as it continues to flow northward from the power plant. Based on this record, it is estimated that 30 major floods and 42 minor floods occur in a 100-year period.

Table 5: Water Discharge Rates above 9,950 cfs
(recorded since 1973 at NYPA Blenheim-Gilboa Pumped Storage Power Plant)

High Flow Dates	Peak Discharge (cfs)	Peak Discharge Date	Time (hour)
December 21-22, 1973	33,000	December 21	1700
December 8-9, 1974	23,700	December 8	2050
April 3-4, 1975	18,050	April 3	1840
March 21-23, 1980	42,000	March 22	2200
April 24-27, 1983	14,610	April 25	1240
April 5-7, 1984	30,000	April 5	2000
April 3-6, 1987	64,800	April 4	2200
May 6, 1989	10,086	May 6	1500
May 11, 1989	10,410	May 11	0920
May 18, 1989	9,957	May 17	0820
November 10-11, 1990	17,070	November 10	2100
March 31-April 1, 1993	11,430	March 31	2020
April 11, 1993	15,477	April 11	0240
April 16-17, 1993	17,940	April 16	0500
November 11-12, 1995	29,070	November 12	0520
January 19-20, 1996	74,677	January 19	1820
January 27, 1996	18,096	January 27	1720
July 13, 1996	20,000+		
November, 1996	20,000+		
March 9-10, 1998	13,470	March 10	0440
May 10-11, 1998	14,100	May 10	2120
June 14, 1998	19,140	June 14	1920
September 16-17, 1999	24,150	September 17	0700
February 28, 2000	12,150	February 28	1000
June 6-7, 2000	23,880	June 6	2340
December 11, 2003	20,018	December 11	1900
September 18, 2004	27,000	September 18	
April 2-3, 2005	55,000		

-Data provided by New York Power Authority

According to a Schoharie County GIS query, approximately 1,400 structures are located within a defined floodplain in the County (733 in the 100-yr floodplain A-Zone). Using National Flood Insurance Program data, it was determined that the total number of insurance claims filed in Schoharie County between 1978 and 2002 were 302 with a total value of \$3,203,791. The total number of insured structures in Schoharie County as of December 2002 was 281. Because there are approximately 732 structures located in a special flood hazard area A-Zone in the County and only 215 A-Zone structures are insured, approximately 517 A-Zone structures are at risk throughout the County. Likewise, an undetermined amount of damage could have occurred to these properties. The municipalities that have filed the most numerous claims since 1978, and have thus received a large portion of the money spent on insurance claims, are the Village of Middleburgh with 114 claims, the Town of Esperance with 52, and the Village of Schoharie with 36 claims. There are also approximately 111 bridges in the Schoharie Watershed.

The following is a count of improved structures in the 100-year floodplain by municipality:

Town of Blenheim: 46	Village of Middleburgh: 137
Town of Broome: 4	Town of Middleburgh: 67
Town of Carlisle: 9	Village of Richmondville: 2
Village of Cobleskill: 73	Town of Richmondville: 3
Town of Cobleskill: 36	Village of Schoharie: 106
Town of Conesville: 10	Town of Schoharie: 21
Village of Esperance: 11	Town of Seward: 8
Town of Esperance: 79	Village of Sharon Springs: 28
Town of Fulton: 36	Town of Sharon: 12
Town of Gilboa: 6	Town of Summit: 2
Town of Jefferson: 3	Town of Wright: 33

A review of the new FIRMs indicates that the most vulnerable locations to flooding are the more developed floodplain areas of the Village of Cobleskill, Town of Esperance, Village of Middleburgh, Town of Middleburgh, and Village of Schoharie. The location of flooding and erosion problems in the County (detailed on maps in Appendix F - CD) attests to this. A series of maps indicating a point location of structures in the 100-year (A-Zone) floodplain are also in Appendix F - CD. A list of critical facilities/vulnerable sites and if the location is threatened by being in a special flood hazard area or dam break inundation zone is located in Appendix D. It is within the municipalities with structures in the floodplain and vulnerable sites and critical areas that hazard mitigation efforts need to be focused. Due to previous mitigation projects, municipalities south of the Village of Middleburgh now face less potential losses.

The method used to estimate potential losses for floods will be modified and improved as the data contained within the Schoharie County Geographic Information System (GIS) is further developed and connections between databases are made. For example, a point identifies each structure in a mapped special flood hazard area in Schoharie County but associating the point with an assessed value is currently being developed. This information will make the estimate of potential dollar losses for a flood event more accurate and this portion of the plan will be revised when this new information is available.

Currently a count of residential versus other (commercial/mixed use) properties in the A-Zone regions of Schoharie County is as follows:

A-Zone Res.	A-Zone Other	Avg. Value of Owner Occupied Units*	A-Zone Res. Values	20% of Res. Values	10k per Other
40	6	\$65,700.00	\$2,628,000.00	\$52,560.00	\$60,000.00
3	1	\$68,300.00	\$204,900.00	\$4,098.00	\$10,000.00
9	0	\$79,900.00	\$719,100.00	\$14,382.00	\$0.00
73	36	\$89,050.00	\$6,500,650.00	\$130,013.00	\$360,000.00
9	1	\$65,000.00	\$585,000.00	\$11,700.00	\$10,000.00
86	4	\$75,100.00	\$6,458,600.00	\$129,172.00	\$40,000.00
33	3	\$82,500.00	\$2,722,500.00	\$54,450.00	\$30,000.00
5	1	\$85,600.00	\$428,000.00	\$8,560.00	\$10,000.00
3	0	\$82,500.00	\$247,500.00	\$4,950.00	\$0.00
137	67	\$82,800.00	\$11,343,600.00	\$226,872.00	\$670,000.00
2	3	\$80,350.00	\$160,700.00	\$3,214.00	\$30,000.00
106	21	\$90,900.00	\$9,635,400.00	\$192,708.00	\$210,000.00
8	0	\$79,100.00	\$632,800.00	\$12,656.00	\$0.00
28	12	\$69,000.00	\$1,932,000.00	\$38,640.00	\$120,000.00
2	0	\$67,100.00	\$134,200.00	\$2,684.00	\$0.00
31	2	\$91,200.00	\$2,827,200.00	\$56,544.00	\$20,000.00
575	157	<i>*From 2000 Census</i>	\$47,160,150.00	\$943,203.00	\$1,570,000.00
GRAND TOTAL	732				\$2,513,203.00

Using average housing value for each community, as determined in the 2000 Census, and an estimate of at least 20% of assessed value in damages and \$10,000 in damages to other structures (including downtime) a conservative estimate of potential flood damages to residences and other uses for a widespread 100-year flood in Schoharie County is \$2,513,203.00, but this figure could reach as high as \$75,000,000.00 with agricultural losses and road infrastructure damage added in.

In addition to major flood events, many additional heavy rainfall events have caused localized drainage problems, ponding, stream bank erosion, roadway damage, and other difficulties.

Flooding is the number one weather related killer, causing an average of three to four deaths per year in New York. Approximately half of those deaths involve people trapped in cars. Floods and flash floods also damage or destroy buildings, cars, utility poles, gas lines, roads, bridges, etc. Transportation and communication systems can be interrupted. Drinking water can be contaminated. Electric power and sewage treatment can be disrupted. Floodwaters often carry damaging debris, which can pose a risk to both life and property. Erosion of stream banks and road ditches can cause significant infrastructure damage. Additional hazards that are likely to be triggered by a flood event include: hazardous material release, transportation accident, power failure, fuel shortage, water supply contamination, food shortage, landslide, disease, and dam failure. The damages and consequent recovery time from a major flood can be extensive. Flooding is New York's most consistently damaging natural disaster. Since 1955, New York has recorded more flood events than any other state in the northeast. Millions of dollars of flood losses are sustained each year due to private property damage, infrastructure damage, disruption of commerce, unemployment caused by floods, the expense of disaster relief, and other related costs. Annual economic losses throughout the state are estimated to be as high as \$100 million (source: *Draft*

New York State All Hazard Mitigation Plan, prepared by Mitigation Section, New York State Emergency Management Office, April 2003).

Floods have devastated more communities and have caused a greater loss of life and property in the United States than all other natural hazards combined. Many people believe that they are not at risk for flooding. Despite this common misconception nearly 9 out of 10 natural disasters in this country are caused by, or involve flooding. In the United States, 300,000 people a year are forced to leave their homes, 200 people are killed and an estimated \$2 billion worth of property is damaged or destroyed because of flooding. Flood prone areas in the United States cover over 7% of the country (150,000 square miles of land). There are 9.6 million households and \$390 billion in property at risk on those areas today. (According to the Federal Emergency Management Agency and the National Flood Insurance Program).

Since 1954 there have been thirty-eight presidential declared disasters in New York State. Of these thirty-eight presidential declarations, twenty-three involved flooding. The eligible federal losses from flooding events since 1954 have been estimated at more than \$500,000,000. Besides the federally declared disasters there have also been a number of flooding events that were not declared major disaster, but still produced large amounts of damage. The losses from those flood events are unknown, but no doubt substantial.

DAM FAILURE:

HAZNY input:

Potential Impact: Throughout a Large Region

Cascade Effects: Highly Likely

Frequency: A Rare Event

Onset: No Warning

Hazard Duration: One Day

Recovery Time: More Than Two Weeks

Impact:

- Serious Injury or Death to Large Numbers
- Severe Damage to Private Property
- Severe Structural Damage to Public Facilities

Definition: Structural deterioration, either gradual or sudden, resulting in the facility's inability to control impounded water as designed, resulting in danger to people and/or property in the potential inundation area. Dams may be either man-made or exist because of natural phenomena, such as landslides or beavers.

Profile/Vulnerability Assessment: Since 1890, there have been at least 41 dam failures in New York State, resulting 10 deaths. This number may not include failures of small structures, for which damages were minimal.

In the event of a dam failure, the sudden release of enormous amounts of water would cause flash flooding downstream of the dam structure. The damage to private property and infrastructure located within the inundation zone could be extensive. The water surge can cause water supply failure, sewer system failure, hazardous material release, power outage, and other cascade effects.

Dam failure can result from many factors such as natural disasters, structural deterioration, or actions caused by man, including terrorism. According to the International Commission of Large Dams (ICOLD), the three major causes of dam failure are overtopping by flood, foundation defects, and piping.

There have been no dam failures (not including agricultural levees) in Schoharie County. According to an editorial in the April 21, 2004 Times Journal (Appendix E), general flooding in the Town of Cobleskill in 1939 did not result from a dam break as widely rumored and no records to substantiate a dam break were found.

There are approximately 132 dams that could impact Schoharie County, including dams in Greene and Albany County. While seven are classified as High Hazard Dams and 18 are classified as Moderate Hazard Dams (See map in Appendix F - CD), the classification does not imply that failure is likely. According to the NYDEC Dam Safety Division, all high hazard dams are inspected annually and all moderate hazard dams are inspected every other year. Because failure would threaten life and property downstream, the following are high hazard dams:

1. Bear Gulch Pond Dam
2. Blenheim-Gilboa Upper Reservoir Dam
3. Cobleskill Upper Reservoir Dam
4. Village of Cobleskill Holding Pond Dam
5. Blenheim-Gilboa Lower Reservoir Dam
6. Cobleskill Lower Reservoir Dam
7. Gilboa (Schoharie Reservoir) Dam

There are two Emergency Action Plans in the Event of Dam Failure that outline preventative measures and detailed procedures that address three of the high hazard dams located in the southern part of the county on north-flowing Schoharie Creek. Annual reviews and scheduled exercises involve Schoharie County representatives. Schoharie County relies on the expertise of the New York City Department of Environmental Protection and New York Power Authority for maintaining the safe operation of their respective facilities on the Schoharie Creek. Evacuation routes and notification are generally outlined in the EAPs. In 2005-2006, Schoharie County has developed more detailed evacuation routes, shelter locations, and notification procedures are currently being improved.

The NYCDEP Bureau of Water Supply administers the EAP for the Gilboa Dam, which impounds water for about a 6-mile reach between the Towns of Gilboa and Prattsville to create the Schoharie Reservoir located about 120 miles north-northwest of New York City. The Schoharie Reservoir is a municipal water supply facility operated in conjunction with the Ashokan Reservoir that is part of the NYCDEP's Catskill system.

The Schoharie watershed topography includes a portion of rough terrain in the Catskill Mountain region to gentle sloping lowlands in the Schoharie Creek valley. Elevations range from 4,110 feet at the headwaters of Schoharie Creek to about 980 feet near the toe of the dam. The contributory drainage area to the Schoharie Reservoir is approximately 314 square miles. Areas downstream (north) of the dam are characterized by moderately wide floodplains usually greater than 1,000 feet in width.

As shown in the inundation maps taken from the Gilboa Dam (Schoharie Reservoir) Emergency Action Plan (Appendix F - CD) the hamlets of North Blenheim, Breekabeen, Central Bridge and the Villages of Middleburgh, Schoharie, and Esperance would all be significantly impacted by a fair weather or wet weather failure of the Gilboa (Schoharie Reservoir) Dam with over 1,000 structures inundated and over 5,000 people directly impacted. If damages were calculated at 20% of the assessed value for improvements in these communities, a conservative estimate of dollar damages to structures in the event of dam failure would easily exceed \$100 million. Depending on the time of year that a break may occur, the impact to the agricultural industry in the Schoharie Valley can exceed \$8 million (according to Schoharie County Agricultural District Surveys). Appendix D lists critical facilities/vulnerable sites that are located in the potential dam break inundation zone. Because a high hazard dam break would most likely be anticipated in plenty of time for evacuations to take place, injuries/deaths would be unlikely. Although highly remote, multiple deaths/injuries could occur, in the event of a sudden catastrophic dam break. In October 2005, the possibility of a Gilboa Dam failure was revealed to be more likely than once anticipated. Work commenced in 2006 to add siphons to the dam, place a notch in the dam to lower water levels, and to anchor the dam. A hastened dam rehabilitation schedule has been announced. Flood control ability and use of the highest design, construction, operation, maintenance and inspection standards on dams is being pursued by Schoharie County and a local citizen action group, Dam Concerned Citizens of Schoharie County. Schoharie County has added a Dam Failure Annex to its Comprehensive Emergency Management Plan to deal with a dam failure scenario.

The two high hazard dams covered in the EAP from New York Power Authority's Blenheim-Gilboa Pumped-Storage Power Project are the Blenheim-Gilboa Lower Reservoir Dam and the Blenheim-Gilboa Upper Reservoir Dam, which are inspected monthly. The Blenheim-Gilboa Dam is used for power generation and is located approximately 5.0 miles downstream of the Gilboa Dam. The dam is about 80-feet high with a total storage capacity of 16,350 acre-feet. Three taintor gates, each 38 feet wide and 45 feet high control the spillway.

Because beaver dams pose a threat in Schoharie County, the county has started to map and monitor them. As their size increases, the impact of beaver dam failure can be great with their expanded capacity to hold

back a substantial amount of water. Flooded roads and blocked culverts are likely to result upon beaver dam failure. It is rumored a beaver dam aggravated a flood in the Village of Sharon Springs.

WINTER STORM (SEVERE):

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: A Frequent Event

Onset: One Day Warning

Hazard Duration: Two to Three Days

Recovery Time: Three Days to One Week

Impact:

- Serious Injury or Death Unlikely
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: A storm system that develops in late autumn to early spring and deposits wintry precipitation, such as snow, sleet or freezing rain, with a significant impact on transportation systems and public safety. Ice storm is included as a separate hazard. For this analysis, the following could meet this definition:

- Heavy snow – Snowfall accumulating to 7 inches in 12 hours or snowfall accumulating to 9 inches in 24 hours.
- Blizzard – A winter storm characterized by low temperatures, wind speeds of 35 miles per hour or greater, and sufficient falling and/or blowing snow in the air to frequently reduce visibility to $\frac{1}{4}$ mile or less for a duration of at least three hours.
- Severe blizzard – A winter storm characterized by temperatures near or below 10 degrees Fahrenheit, winds exceeding 45 mph, and visibility reduced by snow to near zero for duration of at least three hours.

Profile/Vulnerability Assessment: Limited primarily to the late autumn through early spring, most severe winter storms impact all of Schoharie County by causing roadway hazards and transportation accidents. In addition, severe storms are capable of costing thousands of dollars, due to damage to structures resulting from the weight of large accumulations of ice/snow and the removal of snow accumulations. Significant losses attributed to these weather events have included widespread interruption of electric-power delivery to thousands of customers as a result of down power lines and utility poles.

Most recently, the December 2002 and January 2003 snow events prompted FEMA to provide approximately \$380,000 in snow emergency assistance funds to aid Schoharie County towns and villages with the cost of snow removal. Although Schoharie County expects to deal with annual snow removal, major snowfall in a short period of time or blizzard conditions can exceed the normal capacity of local highway departments. Emergency response times can be impeded and the ability for all residents, especially those in the most remote locations of the County, may find fuel and food availability is hindered and utility failures can occur. Most residences in the most rural parts of the County have back up wood heat sources. Access to certain homes can take days to clear, especially dead end roads and residents with long driveways.

According to the National Weather Service, other significant past events in the northeast that impacted Schoharie County include:

The Blizzard of 1888 (March 11-14, 1888)

The blizzard by which all others are measured. Light snow began around 3 p.m. on Sunday the 11th, accumulating to near 3" by midnight. The snow intensified overnight and there was 18" on the ground by daybreak on Monday the 12th. Moderate to heavy snow continued throughout the day accumulating to 33" by midnight. Snow continued on and off through Tuesday the 13th, adding roughly another foot, until finally ending around 3 a.m. on the 14th. Total snowfall for the storm was 46.7", but the drifts were significantly higher.

The city of Albany was virtually shut down. There were no coal deliveries, and thus, no heat. Doctors were unable to make house calls, and it took many days to clear the snow off of country roads to make them passable. At the time it was called the "worst storm in living memory," and it still holds the distinction of the worst winter storm on record in many areas of the northeast.

The Great Appalachian Storm (November 24-25, 1950)

A storm rapidly deepened as it tracked inland along the eastern slopes of the Appalachians. While the rain and snow associated with the storm was not significant, the winds were. The storm was situated between two very strong high-pressure centers, one east of Labrador and another over the Mississippi Valley, producing a very tight pressure gradient. In Albany, the strongest wind gust ever of 83 mph was recorded with sustained winds of 50 to 60 mph. Many trees and power lines were blown down across the region, and wind damage was extensive in New York State, totaling \$20 million.

The Blizzard of '58 (February 15-16, 1958)

A coastal storm brought strong winds and heavy snow to the northeast. Over 30" of snow was reported across the Catskills and in western New England, with 17.9" at Albany. Travel of any sort became impossible, and drifting blocked most roads and highways. Operation "Haylift" was instituted, where helicopters dropped food for stranded cattle.

The Blizzard of '66 (January 29-31, 1966)

Beyond its blizzard conditions, this storm is known for its intense lake squalls that developed as arctic air streamed across Lake Ontario on the 30th and 31st. It produced a foot of snow at Albany on the 29th and 30th. Oswego reported 75" inches, with some unofficial reports of around 100" in that vicinity. Rome, which is approximately 75 miles from Lake Ontario, received 41".

Post Christmas Snowstorm of 1969 (December 25-28, 1969)

A foot of snow had already fallen on December 22, 1969, but this was outdone by another storm system that began moving northward along the East Coast Christmas night. On the morning of the 27th, with 18" already on the ground at Albany, the storm stalled off the New England coast. It then began to move inland for a short period before heading back out to sea on the 28th. A total of 26.7" of snow fell at Albany, the third greatest storm total on record. However, Vermont surpassed that, with 30" at Burlington and 44" at Waitsfield, southwest of Montpelier. In and around the Capital District, it was a heavy, wet snowfall, and the snow mixed with freezing rain at times. Snow removal became quite difficult, and some streets were not cleared for 3-4 weeks. The city of Albany public works continued round the clock snow removal for over a month before things returned near normal. Two million dollars were spent on snow removal, a record at the time.

Thanksgiving Snowstorm of 1971 (November 24-25, 1971)

Heavy snow began on the day before Thanksgiving and continued into Thanksgiving Day. Albany received 22.5", the greatest November snowfall on record, and elsewhere reported 30". This storm created many stranded holiday travelers.

Blizzard of 1978 (February 6-7, 1978)

This storm is better known for its impact on coastal New England and Long Island, but it also impacted eastern New York and western New England. The Green Mountains of Vermont were hit hard, with the Rutland vicinity reporting 30". The Catskills also had quite a bit, with Prattsville reporting 25". Wind also caused significant snow drifting.

On the coast, Boston received 26.7" of snow, their largest storm total on record. The storm also produced strong winds: Logan Airport reported an 83 mph gust and Cape Cod reported 92 mph.

January Snowstorm of 1983 (January 15-16, 1983)

Although well predicted, this classic nor'easter raised havoc across eastern New York and New England. Albany reported 24.5" (5th largest on record) with amounts of just less than 30" reported in Saratoga County. The heavy snow brought travel to a standstill across many locations, and many injuries were reported due to auto accidents.

Surprise October Snowstorm (October 4, 1987)

The earliest measurable snowfall at Albany, where 6.5" inches fell, with as much as 20" reported in parts of the Catskills. The storm wreaked havoc on the area because it was a heavy, extremely wet snow, which fell on fully leafed trees. Numerous branches and trees were felled...taking down power lines with them, blocking roads and damaging houses. Albany was described as "looking like a war zone." Hundreds of thousands of people were without power...some for up to two weeks. It was the most snow that ever fell during the month of October in Albany.

The Downslope Nor'easter (December 10-12, 1992)

This storm produced incredible snowfall totals across many mountainous locations while barely affecting valley locations. Strong east winds caused the air to "downslope" off the Berkshires and Taconics, and "dry it out." Snowfall totals in the Berkshires ranged from 30 to 48 inches with drifts up to 12 feet. Schools were closed for a week and the National Guard had to bring in heavy equipment to remove the snow. The Catskills and Helderbergs also got their share of snow with 18 to 39 inches reported.

On the contrary, the city of Albany received one half-inch of snow with temperatures in the middle 30's on Friday, December 11, which was the height of the storm. Albany received most of its 6" from this storm toward the end of the storm, Saturday the 12th when the winds turned more northerly.

Superstorm of 1993 (March 13-14, 1993)

It was called a superstorm because it affected the entire eastern third of the U.S. with flooding and snow in the Mid-Atlantic States and blizzard conditions in the northeast.

An intense area of low pressure moved out of the Gulf of Mexico and northward along the east coast, dropping the pressure to record levels at many locations along the eastern seaboard. Albany reported 28.68 inches of mercury, the fifth lowest pressure on record.

The storm dumped 26.6" at Albany, the second highest storm total on record, while other areas received as much as 40", with Halcott Center reporting 40" and Prattsville receiving 36". During the peak of the storm, snow was falling at the rate of 5 or 6 inches an hour in some locations. Strong winds compounded the problem, as there was significant blowing and drifting of the snow, as well as structural damage. Travel was extremely difficult and a state of emergency was declared across most of eastern and central New York State.

Hazards Rated as Moderately Low

SEVERE STORM:

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: A Frequent Event

Onset: Several Hours Warning

Hazard Duration: Less Than One Day

Recovery Time: One to Two Days

Impact:

- Serious Injury or Death Unlikely
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: Severe storms include hailstorms, windstorms, and severe thunderstorms (with associated severe wind events such as derechos, gustnados, and downbursts). A thunderstorm is a local storm produced by a cumulonimbus cloud and is accompanied by lightning and thunder. Thunderstorms are often accompanied by gusty winds, heavy rain, and occasionally by hail. Although all thunderstorms are potentially hazardous, the National Weather Service classifies a thunderstorm as severe if it produces winds greater than 57 mph or hail $\frac{3}{4}$ inch in diameter or larger.

The damaging winds of thunderstorms include:

- Straight-line winds – high winds across a wide area.
- Downbursts – localized currents of air blasting down from a thunderstorm, which induce and outward burst of damaging wind on or near the ground.
- Micro bursts – minimized downbursts covering an area of less than 2.5 miles across. They induce a strong wind shear (a rapid change in the direction of wind over a short distance) near the surface. Microbursts may or may not include precipitation and can produce winds over 150 miles per hour.

Profile/Vulnerability Assessment: New York experiences an average of 323 severe thunderstorms each year. According to the National Severe Storms Laboratory, Schoharie County experiences approximately 4 days per year with thunderstorms capable of producing winds of 50 knots or more and 2 days per year with small hail. National Weather Service records indicate that from 1983 to 2003, Schoharie County experienced severe weather reports an average of 3.7 times per year and hail occurred 0.65 times per year. Nine to ten people per year die in New York State from thunderstorm winds, usually due to trees falling on a house or car. New York State ranks fourth in the nation for lightning deaths (an average of 3 per year) and fifth for lightning injuries (an average of 13 per year). The County Public Works and Town/Village Highway Departments must clean up debris from a severe storm at least once a season.

Although tornadoes grab headlines due to their swift and destructive nature, flash floods, lightning, straight-line winds, and hail are more common by-products of thunderstorms and result in many more deaths and millions of dollars in damage each year. Large hail can impact surfaces at speeds greater than 100 mph, causing injury and property damage. Thunderstorms have the potential to spawn tornadoes or trigger utility failures, transportation accidents, flash flooding, and fires. Most thunderstorms occur during the late afternoon and evening hours of spring and summer, which coincides with the season of outdoor activities. The impacts of severe thunderstorms and hailstorms are usually localized.

Windstorms involve sustained, potentially damaging, high winds. Straight-line thunderstorm winds occasionally exceed 100 mph. Major high-wind events can extend horizontally for hundreds of miles. The duration of the event ranges from about 4 hours up to 2 to 3 days, usually with nocturnal lulls. The greatest dangers from high winds are roof failure, breaking glass, and flying debris (airborne missiles). Strong winds can knock down trees, utility poles, and power lines. They can damage or destroy buildings, vehicles, and crops. Blowing dust can impair visibility. Debris can block transportation routes. If the strong wind occurs in conjunction with a winter storm, it can create wind-driven snow, severe drifting, and dangerous wind chill. Starting in January 2003, the New York State Building Code currently requires construction for a design wind speed of 90 mph in Schoharie County. The building code also includes higher wind standards for structures that represent a higher hazard to human life in the event of failure.

The entire County is vulnerable to damage from thunderstorms, hail, or wind. Those most at risk from lightning are people who are outdoors, especially under or near tall trees, in or on water, and on or near hilltops. Severe storms occasionally produce strong winds that exceed the design speeds of building codes and can thus impact the entire County. The most severe damage from wind would be expected in mobile homes, farm buildings, and other structures that may not have been constructed to withstand high wind speeds. Agricultural areas may experience financial losses associated with crop damage. According to the NWS, since 1962, almost \$9,000,000.00 in damages has been caused by severe storms in Schoharie County. A high wind event on December 12, 2000 resulted in \$1,000,000 in damages. Average events cause between \$5,000 and \$50,000 in damages.

The most devastating damages from severe storms (in addition to the potential to trigger tornadoes and floods) are likely to result from high winds. Wind speeds in excess of 100 mph can cause damages comparable to those from a moderate-intensity tornado.

TERRORISM:

Potential Impact: Throughout a Large Region

Cascade Effects: Highly Likely

Frequency: A Rare Event

Onset: No Warning

Hazard Duration: Two to Three Days

Recovery Time: More Than Two Weeks

Impact:

- Serious Injury or Death to Large Numbers
- Moderate Damage to Private Property
- Moderate Structural Damage to Public Facilities

Definition: The threat or use of violence to achieve political/social ends usually associated with community disruption and/or multiple injuries or deaths. School violence or threat of violence within a public school.

Profile/Vulnerability Assessment: Schoharie County has no history of terrorist incidents. Past threats of school violence in Schoharie County have included bomb threats in the Cobleskill-Richmondville School District and Middleburgh School District but the motivations for these threats were such that they are not considered to be terrorist incidents. Following anthrax poisoning in 2001, the nation experienced copycat mailing of white powder and widespread paranoia. Schoharie County did have one event of “powder in a letter” in the Village of Richmondville that did not result in an actual terrorist incident.

Computer viruses or hacking can cause damages, but are unlikely to disrupt essential services. The most likely terrorist incidents to impact Schoharie County are those that actually occur elsewhere. Events of September 11, 2001 require Schoharie County to focus more attention on terrorist incidents. Although it is unlikely that a high profile, sudden impact terrorist event would occur in a rural county, the presence of 2 dams on Schoharie Creek and their relation to the water supply for New York City, the energy supply of New York State, and the potential for large property and human loss makes them potential targets. Although high profile terrorist attacks are more likely to occur in major population centers, a change in terrorist tactics cannot be ignored. For example, if terrorists simultaneously attack numerous small “soft” targets around the United States, such targets in Schoharie County could include SUNY Cobleskill, school buildings, government offices, hospitals, local water supplies, and places likely to have large concentrations of people, including shopping centers.

Terrorist activity will more likely come in the form of insidious, not readily detected illness related to infectious disease exposure or biological, chemical and radiological events. Such an event in other areas could require resources in Schoharie County to be utilized. The municipalities in Schoharie County need to be as prepared as possible to deal with the unexpected attack on either soft or higher profile targets and/or help prevent terrorist attacks. The September 11, 2001 terrorist attacks had emotional and economic impacts on the entire County. Schoharie County has a list of potential targets, a plan to protect the targets, and a plan for bioterrorism prevention/response that are not for public viewing.

A terrorist incident in Schoharie County could have significant human costs, with community-wide impacts. Terrorists often seek to maximize destruction, so their intent may very well be to trigger other hazards, such as air/water contamination, utility failure, civil unrest, fire, hazardous material release, structural collapse, or explosion. Dollar damages are difficult to estimate, as human ways to maximize destruction are seemingly limitless.

OIL SPILL:

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: A Regular Event

Onset: No Warning

Hazard Duration: Two to Three Days

Recovery Time: Less Than One Day

Impact:

- Serious Injury or Death Unlikely
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: The uncontrolled or accidental discharge of petroleum into water and/or onto land or sea.

Profile/Vulnerability Assessment: Approximately 95% of the spill events that require response by the NYDEC involve petroleum products. Most of these incidents involve leaking underground storage tanks or the release of fuel due to a motor vehicle crash. The most frequent fixed site petroleum spill incidents responded to by Spills Engineers from the NYDEC involve the releases from abandoned underground storage tanks. The cleanup costs for these incidents typically range from a minimum of \$10,000 to \$50,000 or more if groundwater is contaminated. The most frequent transit-related petroleum spills involve the release of fuel due to traffic accidents. A tractor-trailer accident can result in a surface spill of 50 to 300 gallons of diesel oil, which requires a response from the NYDEC and contractor work to clean up the site. The typical cost for this type of incident is \$2,500 to 10,000 (estimate from NYDEC Spills Engineer). Smaller releases can be managed by fire departments. Ruptured pipelines can release large volumes of material, particularly if the rupture is not detected. The resulting environmental contamination can take years and millions of dollars to clean up. Although a transportation accident resulting in a petroleum spill could occur on county and municipal roads, the provability of significant releases is greatest along the state highways, which carry more truck traffic.

Agway has large storage facilities in Schoharie County. Large oil storage locations in the County have been mapped along with hazardous material storage locations. The Schoharie County Sheriff and/or County Fire Coordinator can grant access to the maps for emergency response use only. Some oil spill events have occurred in the County at the County Office Building in Schoharie, Camp Summit in Fulton, and MacArthur Avenue in Cobleskill. The oil spill in the County Office Building disrupted operations for several days and the cleanup exceeded \$150,000.00.

WILDFIRE:

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: A Regular Event

Onset: No Warning

Hazard Duration: Two to Three Days

Recovery Time: Less Than One Day

Impact:

- Serious Injury or Death Unlikely
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: An uncontrollable combustion of trees, brush, or grass involving a substantial land area that may have the potential for threatening human life and property.

Profile/Vulnerability Assessment: Most wildfires are started by people through negligent behavior or by downed power lines. The risk of wildfire is greatest during drought conditions, when the moisture content of forests and grasslands is low. The National Weather Service uses the term fire weather for the meteorological conditions that promote the spread of fire. Those weather conditions that promote the ignition and rapid spread of fires include: low humidity, high winds (over 10-20 mph), dry thunderstorms (i.e., lightning without rain), unstable air, and dry antecedent conditions. Other factors that contribute to the spread and severity of fires include the available fuel, terrain (fire spreads faster uphill than downhill), and the urban-wildland interface.

Development patterns in the towns of Schoharie County are such that a wildfire is not likely to impact a large number of structures. Most buildings in the rural and developed parts of the community are surrounded by lawns, which protect against the spread of fires from wooded areas. The use of asphalt shingles also protects against the spread of fire. All fires pose a risk to the firefighters who work to control the blaze. A 2004 spring wildfire required two firefighters to be treated for heat exhaustion. Heavy rains following a wildfire may induce landslides, mudflows, and floods due to the inability of the burned areas to absorb water because of the absence of foliage and groundcover. In addition, fires may cause power failures, air contamination, hazardous material releases, structural collapse, or transportation accidents.

The risk of wildfires is greatest in the southern part of the County (Town of Blenheim, Broome, Conesville and Fulton, Gilboa, and Jefferson) where densely wooded areas and steep slopes exist. The majority of forested land is managed by the NYDEC and undergrowth is managed to not become a hazardous fuel source. The Town of Fulton has the largest forested acreage with approximately 13, 467 acres (See Table 2). Although the County recognizes the potential for wildfire in the County, the densely wooded rural hillsides of Schoharie County contain only scattered residential development usually with lawns, which is the at the main risk from wildfires. Large population centers (villages) in Schoharie County are located in agricultural areas where dense forest or grasslands do not abut.

According to the County Fire Coordinator, past wildfires have been small in size, usually impacting less than 10 acres and no structures are usually threatened. A cluster of residential homes near forested areas includes the Hamlet of Eminence in Towns of Blenheim, Jefferson, and Summit (see map in Appendix F - CD).

The spring 2004 Town of Fulton wildfire impacted 6 acres near Patria. 14 fire departments responded, two firefighters were injured, but no structures were threatened. In the 1950s, a forest fire in the Town of Conesville burned several hundred acres. Damages to single-family homes could range from \$50,000 to \$200,000.

FIRE:

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: A Regular Event

Onset: No Warning

Hazard Duration: One Day

Recovery Time: Less Than One Day

Impact:

- Serious Injury or Death is Likely, but not in Large Numbers
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: The uncontrolled burning in residential, commercial, industrial, institutional, or other properties in developed areas.

Profile/Vulnerability Assessment: people through negligent behavior start most fires. Although house fires are a regular occurrence in Schoharie County, they rarely spread to adjacent properties. Fires impacting larger facilities are possible. The largest building in the County is the Wal-Mart Distribution Center in the Village of Sharon Springs with approximately 1.5 million square feet. The SUNY-Cobleskill campus buildings are mostly masonry construction. The 1971 Olsen's Newbury building fire in the Village of Cobleskill was a significant event for Schoharie County. The Schoharie County Courthouse burned down in 1845 and was damaged by fire in 1870. In 1874 a section of the downtown Village of Cobleskill burned. More recently, fires are usually confined to single-family residences in part due to more stringent building and fire code requirements in commercial, industrial, and public buildings.

A major fire outside the villages in Schoharie County is expected to be confined to a single structure or building complex. Development patterns are such that most buildings are surrounded by lawns or parking areas, which protect against the spread of fires to adjacent structures. The use of asphalt shingles also protects against the spread of fire. All fires pose a risk to occupants of the buildings involved and to the firefighters who work to control the blaze. Fires may cause power failures, air contamination, hazardous material releases, structural collapse, or transportation accidents.

The areas most vulnerable to multi-structure fires are those with closely spaced older buildings. Mobile home parks have closely spaced trailers. Many church buildings are vulnerable due to the wide expanses within which it would be unsafe for firefighters to combat a blaze. Elderly residents are more likely to be injured or killed by a fire, due to limited mobility and susceptibility to respiratory problems from the smoke. There are several deaths or injuries from fires treated at the hospital each year. Recently, two deaths occurred in a mobile home fire in the Town of Cobleskill. The structure had no working smoke detectors.

A fire in a large structure could result in millions of dollars in damages. Single-family homes range from \$50,000 to \$200,000 (average housing value in Schoharie County - \$82,500).

WATER SUPPLY CONTAMINATION:

Potential Impact: Throughout a Small Region

Cascade Effects: Some Potential

Frequency: A Regular Event

Onset: No Warning

Hazard Duration: More Than One Week

Recovery Time: Less Than One Day

Impact:

- Serious Injury or Death Unlikely
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: The contamination or potential contamination of surface or subsurface public water supply by chemical or biological materials that results in restricted or diminished ability to use the water source.

Profile/Vulnerability Assessment: The New York State Department of Health is currently evaluating the susceptibility of public water supplies to potential contamination as part of the Source Water Assessment Program. Protective measures will be implemented as warranted.

Schoharie County has five reservoirs and seven community water suppliers. The County receives many complaints about the water. It is anticipated that any contamination problem to a public water supply would be identified and resolved quickly. It is unlikely that public health impacts would occur due to testing procedures and prior notification to consumers. Private well water could go undetected and untreated for a long period.

MINE COLLAPSE:

Potential Impact: Throughout a Small Region

Cascade Effects: Some Potential

Frequency: A Rare Event

Onset: No Warning

Hazard Duration: Less Than One Day

Recovery Time: One to Two Days

Impact:

- Serious Injury or Death Unlikely
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: The folding, caving in or sudden implosion of an underground cavity. Such an event would threaten persons inside the cavity and/or persons, property and structures on the surface.

Profile/Vulnerability Assessment: A small mine exists in the Town of Cobleskill under the former Howes Cave Cement Plant (see map in Appendix F - CD). The mine is no longer active, but is used for educational purposes by area colleges. Planned quarrying and a proposed mining museum and educational facility are planned for the site and the integrity of the mine is such that such development should not compromise stability and complete collapse is unlikely. A small collapse is more likely to occur inside the mine; therefore exploration inside should be undertaken only under the instruction of experienced people.

LANDSLIDE:

Potential Impact: Throughout a Small Region

Cascade Effects: Some Potential

Frequency: An Infrequent Event

Onset: No Warning

Hazard Duration: Less Than One Day

Recovery Time: One to Two Days

Impact:

- Serious Injury or Death Unlikely
- Little or No Damage to Private Property
- Moderate Structural Damage to Public Facilities

Definition: The downward and outward movement of slope-forming materials reacting to the force of gravity. Slide material may be composed of natural rock, soil, artificial fill, or combinations of these materials. The term landslide is generalized and includes rock-falls, rockslides, creep, block glides, debris slides, earth-flow, mudflow, slump, and other similar terms.

Profile/Vulnerability Assessment: Schoharie County is located in an area of New York State that is classified as having a low susceptibility for landslides (source: *New York State All Hazards Mitigation Plan*). In fact, there has been no significant landslide damage in Schoharie County. Robert Fickies, Associate Scientist in Geology for NYS, also reports that the landslide possibility for Schoharie County is very low. His NYS Landslide Inventory Map shows only 5 landslides for Schoharie County, all of which were human induced slides. Most were due to improper slope and cut designs during road construction. They occurred at the intersection of Rte 7 and Rte. 10 in Richmondville, on Rte. 7 in Warnerville, in Middleburgh, and on Rte. 30 north of North Blenheim.

The steep topography in some parts of the County, combined with the presence of poorly consolidated glacial deposits, may pose landslide hazards in some areas. The risk of landslides increases if clear cutting occurs on steep slopes (greater than 15%).

Most of the steep slopes in Schoharie County that might be subject to slope failure are in undeveloped or sparsely developed areas. A landslide could destroy buildings and infrastructure in a localized area. Injury or death of people in the affected area is possible, but unlikely. In addition, a landslide that blocks a stream or drainage way could back up water and cause flood damage.

The steep areas that pose the highest risk for landslides are on rural hillsides where development is unlikely to be impacted. However, it is advisable that any development or timber harvesting on steep slopes include an evaluation of the potential to destabilize the slope and induce landslides.

The potential consequences of a landslide in Schoharie County could include destruction of one or two rural buildings and adjacent infrastructure (roads, utilities, pipelines). These losses could cost several hundred thousand dollars.

A landslide associated with stream bank erosion exists in the Town of Seward off of Patrick Road and the West Creek. This slide has required Patrick Road to become one lane near the slide. Further failure could result in the loss of the use of the road or a transportation accident.

HAZMAT (IN TRANSIT):

<u>Potential Impact:</u>	Throughout a Large Region
<u>Cascade Effects:</u>	Some Potential
<u>Frequency:</u>	An Infrequent Event
<u>Onset:</u>	No Warning
<u>Hazard Duration:</u>	One Day
<u>Recovery Time:</u>	Three Days to One Week
<u>Impact:</u>	

- Serious Injury or Death to Large Numbers
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: The uncontrolled release of material during transport, which when released can result in death or injury to people and/or damage to property and the environment through the material's flammability, toxicity, corrosiveness, chemical instability and/or combustibility.

Profile/Vulnerability Assessment: Schoharie County occasionally has transportation crashes that result in the release of hazardous materials. Fortunately, these incidents generally involve small quantities of material. The potential also exists for a more serious incident involving a pipeline failure, train derailment, or tank truck crash that releases large volumes of hazardous materials. At certain times of the year, the agricultural industry uses quantities of fertilizer that have explosive or other dangerous qualities.

The packaging used to ship hazardous material generally prevents catastrophic releases of highly toxic substances. However, transportation accidents resulting in the release hazardous materials can result in fire, explosion, release of toxic fumes, water supply contamination, agricultural damage, or environmental contamination. If an acutely toxic substance is dispersed in the atmosphere, the area of concern can extend as far as 10 miles from the site of the release. Rupture of a natural gas pipeline can cause an explosive force sufficient to level buildings (an event that occurred in North Blenheim - detailed in "Explosion"). An overturned tanker or derailed tank car may take a week or more to mitigate. If contaminants are dispersed into the environment, the cleanup can take years.

The transportation routes through the County and the areas that have historically been vulnerable to transportation accidents are shown on the Transportation Accidents Map in Appendix F - CD. Although a transportation accident involving hazardous material could occur on county and municipal roads, the probability is greatest along the railroad line and the state highways. These principal transportation routes pass through more densely populated areas of the County. The three main natural gas transmission pipelines and distribution lines are also vulnerable. The erosive nature of the area's streams poses a threat to shallow pipelines in the valleys or at stream crossings. Most of the residents and businesses in the County are located within one mile of a railroad, state highway or pipeline.

A credible worst-case hazardous material incident could result from an accident that ruptures a railroad car containing hazardous materials. If the released material is subject to atmospheric dispersion, the radius of concern could be as much as 10 miles (for example, ammonia, chlorine, or nitric acid). If a release occurs along the railroad near the Villages and requires evacuation of a 5-mile radius, approximately 10,000 residents would be displaced. The estimated cost of these residents would be at least \$250,000 (based on a Red Cross estimate that expenses are a minimum of \$25.00 - \$100.00 per person per day). In addition to emergency response expenses, casualties, and medical expense, the

property damage and environmental cleanup costs resulting from a hazardous material release could be hundreds of thousands of dollars. The assessed value of property within one mile of this potential derailment site is in excess of 100 million dollars.

TRANSPORTATION ACCIDENT:

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: An Infrequent Event

Onset: No Warning

Hazard Duration: Less Than One Day

Recovery Time: Three Days to One Week

Impact:

- Serious Injury or Death to Large Numbers
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: A mishap involving one or more conveyances on land, sea, and/or in the air that results in mass casualties and/or substantial loss of property.

Profile/Vulnerability Assessment: Schoharie County experienced a large transportation accident with injuries involving a school bus and a dump truck in the Town of Schoharie. According to the National Transportation Safety Board website, about 10:30 a.m. on October 21, 1999, a Kinnicutt Bus Company school bus was transporting 44 students, 5 to 9 years old, and 8 adults on an Albany City School No. 18 field trip. The bus was traveling north on State Route 30A as it approached the intersection with State Route 7, which is about 1.5 miles east of Central Bridge, New York. Concurrently, an MVF Construction Company dump truck, towing a utility trailer, was traveling west on State Route 7. The dump truck was occupied by the driver and a passenger. As the bus approached the intersection, it failed to stop as required and was struck by the dump truck. Seven bus passengers sustained serious injuries; 28 bus passengers and the truck driver received minor injuries. Thirteen bus passengers, the bus driver, and the truck passenger were uninjured. Bassett Hospital of Schoharie County treated 42 victims, including 37 children and five adults. Two of the victims were transferred to Albany Medical Center.

Students were wearing seat belts at the time of the accident. By state law, school buses manufactured after July 1, 1987, must be designed to include seat belts and increased seat padding on the passenger seats.

No major air or rail crashes have occurred in the County; however, such an accident cannot be ruled out. A major air crash could quickly overwhelm local resources and mitigating such an event can only be addressed through proper emergency response training. The most vulnerable area for a rail accident is in the Village of Cobleskill. A freight rail accident in the Village of Cobleskill could potentially cause damage to buildings. (Add more information about structures along rail).

TORNADO:

Potential Impact: Throughout a Large Region

Cascade Effects: Highly Likely

Frequency: An Infrequent Event

Onset: No Warning

Hazard Duration: Less Than One Day

Recovery Time: Three Days to One Week

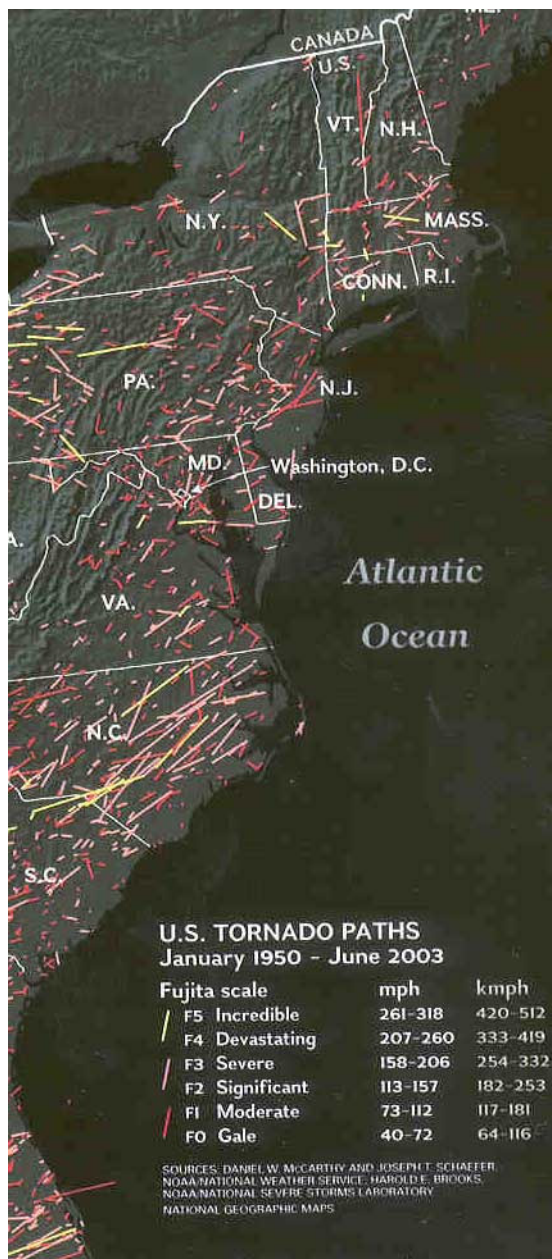
Impact:

- Serious Injury or Death Unlikely
- Moderate Damage to Private Property
- Moderate Structural Damage to Public Facilities



Damage to Schoharie County home resulting from July 1989 F3 tornado

Definition: A tornado is a violently rotating column of air that extends from the base of a thunderstorm and comes in contact with the ground. The vortex, up to several hundred yards wide, is visible to the observer as a whirlpool-like column of winds rotating about a hollow cavity or funnel. Tornadoes are the most violent storms on earth, with estimated winds speeds of 200-300 miles per hour.



Profile/Vulnerability Assessment: Contrary to most beliefs, hills and mountains offer no protection from tornadoes. New York State has an average of five tornadoes a year, which can occur in any region. Compared with other states, New York ranks number 30 for frequency of tornadoes, 27 for number of deaths, 30 for injuries and 26 for cost of damages. The risk of death in any one year is 1 in 39,088,695. These figures come from the New York Disaster Center web page.

The map at left indicates the paths and intensity of tornadoes in the eastern U.S. from 1950 – June 2003. The entire County is vulnerable to tornado damage. Damage paths for tornadoes can be in excess of 1 mile wide and 50 miles long. There are reports of at least 3 tornadoes in Schoharie County since 1830. The most destructive occurred on July 10, 1989. A F3 tornado moved across Schoharie County causing a 12-mile line of destruction from Carlisle to Schoharie. 20 homes sustained damage and approximately 20 people were injured. Damages were estimated to be near 25 million. A F1 tornado occurred on May 2, 1992. Damages were estimated to be near \$250,000.00.

Despite improved weather forecasting capability, tornadoes can occur with little or no warning (NWS national average on tornado warning lead time is approximately 12 minutes). A tornado is a great threat to life and usually causes catastrophic damage to property within its path. The winds in the strongest tornadoes are the fastest winds experienced anywhere on earth, with rotation velocities up to 300 mph. They can result in the total destruction of homes (especially

mobile homes), businesses, cars, etc. and cause many deaths. Extensive damage to electric and telephone lines is likely. Extensive tree damage along roadways may inhibit or block access. Damaged or destroyed radio and television towers can impede communication. Because tornadoes are associated with thunderstorms, they may be preceded or followed by heavy rainfall or hail. This violent path of destruction caused by a tornado is likely to result in serious injury or death and moderate to severe damage to public and/or private property. Tornadoes can trigger many other hazards, including power outages, structural collapse, fires, and hazardous chemical releases.

According to the “Taking Shelter from the Storm” guide published by FEMA, Schoharie County is in a low risk wind zone with less than 1 tornado per 1,000 square miles and a 160 mph – 200 mph wind zone. Tropical storms can impact the County, but hurricane force winds are rare. The NYS Building Code requires structures to be built to withstand 90 mph winds in the County. Beginning in January 2003, the building code includes higher wind standards for structures that represent a higher hazard to human life in the event of failure. Buildings constructed in compliance with this code should be able to withstand lower intensity tornadoes, but may be unable to withstand the design wind speed recommended by the ASCE, American Society of Civil Engineers. The NY State Emergency Management Office reports that the vast majority of tornadoes are within the design speeds of building codes (85% have wind speeds of less than 112 miles per hour).

Following the 1998 tornadoes, building officials in Stillwater, NY observed that new and old construction was damaged equally. However, In Mechanicville, NY, building officials indicated that old construction seemed to fair better than new construction. Stonewall and concrete block foundations performed worse than poured concrete foundations. Houses with plywood sheathing held up better than those with cheaper materials, such as chipboard. Some strap braces failed. Many homes were punctured with flying debris. This was less of a problem with homes that had plywood sheathing rather than cheaper materials. Trusses in modular home construction were observed to have failed in the center at the gusset plate even though the remainder of the truss was intact. (Source: NY State Emergency Management Office).

Potential dollar damages are difficult to estimate for a tornado event in Schoharie County. Damages exceeded \$25,000,000.00 from the 1989 and 1992 tornadoes. A F3 tornado impacting any of the Villages could devastate several structures, result in multiple deaths/injuries and result in millions of dollars in damages. On the other hand, a tornado impacting an undeveloped area could result in far less damage to agricultural crops, forest, or some single-family housing. Mitigation efforts should focus on advance warning and proper building construction.

UTILITY FAILURE:

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: An Infrequent Event

Onset: No Warning

Hazard Duration: Four Days to One Week

Recovery Time: One to Two Days

Impact:

- Serious Injury or Death Unlikely
- Moderate Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: Loss of electric and/or natural gas supply, telephone service, or public water supply as a result of an internal system failure and as a secondary effect of another disaster agent.

Profile/Vulnerability Assessment: A widespread and prolonged utility outage is most likely to occur as a cascade effect of another hazard (severe winter storm, ice storm, flood, etc.). These incidents are evaluated elsewhere under this plan. The loss of power generally results from damage to power lines (due to high wind, ice, traffic accidents, etc.) or transmission equipment (often resulting from animal damage). Telephone service can be lost due to overloaded systems, mechanical problems, or damage to phone lines. The ongoing maintenance and operational procedures of each utility provider are intended to minimize the risk of service disruption.

Due to our widespread reliance on electricity, telephones, and potable water, the loss to these services can disrupt many ordinary activities. Emergency communications may be impaired if it becomes necessary to rely on radio communications. A water supply failure can result in an increased fire hazard if it becomes necessary to transport water to areas normally served by fire hydrants. A prolonged power failure can impact heating, food (spoilage, inability to cook), water supplies, industrial processes, and businesses. The most likely cause of injury or death is from unsafe use of alternate fuel sources for heating, cooking and lighting.

The entire community is vulnerable to the potential impacts of an electricity or telephone outage. An extended utility outage in the County would represent an inconvenience for most residents, with economic losses for some businesses. The greatest economic loss would be for the utility itself, which must provide the crews and equipment to restore service. The northeast blackout in August 2003 affected $\frac{3}{4}$ of the County. Commercial grocery businesses with generators were positively impacted whereas, businesses without generators were harmed.

ICE STORM:

Potential Impact: Throughout a Large Region

Cascade Effects: Highly Likely

Frequency: An Infrequent Event

Onset: Several Hours Warning

Hazard Duration: One Day

Recovery Time: One to Two Weeks

Impact:

- Serious Injury or Death Unlikely
- Moderate Damage to Private Property
- Moderate Structural Damage to Public Facilities

Definition: Freezing rain that accumulates in a substantial glaze layer of ice resulting in serious disruptions of normal transportation and possible downed power lines.

Profile/Vulnerability Assessment: When ice encases exposed surfaces, hazardous road conditions disrupt transportation. The weight of the ice can knock down trees and power lines, disrupting power and communication for days. Additional hazards that can be triggered by an ice storm include: transportation accidents, power failure, fuel shortage, and food shortage. Normal emergency operations, such as police, fire and ambulance service, can also be impeded. Since the same conditions may occur over a large area, aid from neighboring jurisdictions may not be available. The entire County is vulnerable to the impact of ice storms.

On December 4-5, 1964, freezing rain caused ice accumulations of up to 1.5 inches and crippled east central New York. Many residents lost power for up to two weeks and schools had to be shut down for a week. Damage estimates approached \$5,000,000 dollars.

A January 1998 ice storm impacting six counties in northern New York was one of the most severe in the State's history. Nine people were killed, most by carbon monoxide poisoning associated with heating devices. Damage was widespread and more than 320,000 people were without electricity. Power was not completely restored for 23 days. Many dairy farmers lost their cows. Documented damages of about \$56,000,000 were recorded by NYSEMO.

The National Weather Service reports that New York has one of the highest incidences of ice storms in the U.S., with freezing rain and icing occurring somewhere about 10 days per year. An ice storm as severe as the 1964 and 1998 disasters could also occur in Schoharie County. In recent years Schoharie County experienced slight ice accumulations an average of 2 times per year. These events have typically lasted for less than one day.

The 1998 North Country ice storm resulted in power outages for 320,000 people in seven counties and documented disaster assistance totaling \$55,950,736 (source: New York State Emergency Management Office). This corresponds to average damages of about \$175.00 per person. These statistics do not include all damages and the average is much lower than the damages incurred in the most severely impacted areas. If the Schoharie County (2000 census population of 31,582) experiences an ice storm with damages of \$174.00 per person, countywide losses would exceed \$5,500,000.

FUEL SHORTAGE:

<u>Potential Impact:</u>	Throughout a Large Region
<u>Cascade Effects:</u>	Some Potential
<u>Frequency:</u>	An Infrequent Event
<u>Onset:</u>	More Than One Week Warning
<u>Hazard Duration:</u>	More Than One Week
<u>Recovery Time:</u>	One to Two Days

Impact:

- Serious Injury or Death Unlikely
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: A situation in which the normal quantity and/or timely delivery of fuel supplies to distributors and retail establishments are interrupted for a substantial period of time.

Profile/Vulnerability Assessment: There have been no fuel shortages in Schoharie County since the OPEC oil crisis in the early 1970's. A local fuel shortage could result from a prolonged disruption of transportation, which might be caused by a winter storm, flood or other major event. Supply shortages can occur as a result of trade, transmission difficulties, or unexpectedly high demand. The probability of a severe fuel shortage is considered to be low.

The primary impact of the oil shortage in the 1970's was economic, with customers experiencing long lines and high prices. A wintertime shortage of heating oil or natural gas could lead to injuries and deaths due to an inability to provide adequate heat or inappropriate use of alternate heat sources.

Because a fuel shortage would result in higher prices, lower income residents and businesses with high fuel use (such as truckers and farmers) would be most vulnerable.

EXPLOSION:

<u>Potential Impact:</u>	Throughout a Small Region
<u>Cascade Effects:</u>	Highly Likely
<u>Frequency:</u>	An Infrequent Event
<u>Onset:</u>	No Warning
<u>Hazard Duration:</u>	Less Than One Day
<u>Recovery Time:</u>	Three Days to One Week

Impact:

- Serious Injury or Death is Likely, but not in Large Numbers
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: The threat or actual detonation of an explosive device or material with the potential of inflicting serious injury to people or damage to property

Profile/Vulnerability Assessment: A liquid propane gas explosion destroyed 10 homes, killed two men and injured four others in the center of the hamlet of North Blenheim on March 13, 1990. The gas had escaped from an eight-inch Texas Eastern Transmission Corp. line that ran beneath the Westkill Road about a third of a mile above the hamlet. The pressurized liquid gas vaporized when it hit the air and

because it was heavier than the air, it clung to the land and crept down the Westkill Creek cleft that the road follows to a T intersection with NYS Route 30. It then spread out over the middle of the hamlet of about 100 people.

At 7:30 am, the Blenheim Assistant Fire Chief realized something was wrong and tried to alert passers-by and residents. He was killed when the gas ignited. A Central Bridge resident died of burns later in the day at the Albany Medical Center. The victim sustained second and third-degree burns over most of his body.

The leaky line burned in a bright orange plume of fire that continued to burn 100 feet into the air hours afterwards. Hundreds of firefighters from 20 fire companies in a 20-mile radius responded and the fire took out both telephone and electrical services for several miles around.

Dominion Transmission, Inc., Iroquois Pipeline Company, Tennessee Gas Pipeline Company, and Texas Eastern Products Pipeline Company operate the pipeline. They have an Emergency Response Manual for Emergency Response Personnel of Montgomery, Schenectady and Schoharie Counties.

An explosion generally occurs with little or no warning. It can cause serious injury or death to those in the immediate vicinity of the explosion and damage to the surrounding property. If it occurs in a building, that structure is likely to be extensively damaged or destroyed. An explosion can trigger a fire, transportation accident, hazardous material release, or other event.

HAZMAT (FIXED SITE):

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: An Infrequent Event

Onset: No Warning

Hazard Duration: One Day

Recovery Time: Less Than One Day

Impact:

- Serious Injury or Death is Likely, but not in Large Numbers
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: The uncontrolled release of material from a stationary facility, which when released can result in death or injury to people and/or damage to property and the environment through the material's flammability, toxicity, corrosiveness, chemical instability and/or combustibility.

Profile/Vulnerability Assessment: A propane gas leak did occur in the Village of Richmondville with no injuries or damage reported.

Twenty-one facilities in Schoharie County report hazardous material inventories to the EMO under SARA Title III. Additional facilities file 209-U reports with local fire departments. These legal businesses are believed to be in compliance with reporting and safety requirements. The NY Building Code sets higher standards for seismic, snow loading, and wind for buildings that contain "sufficient quantities of toxic or explosive substances to be dangerous to the public if released." The agricultural industry uses fertilizers that have harmful or explosive capabilities if misused or stored improperly on a farm. Clandestine drug manufacturing sites are a potential risk for hazardous material releases.

Incidents involving hazardous materials may result in fire, explosion, release of toxic fumes, water supply contamination, or other environmental contamination. An air or water contamination could cause a problem for miles from the release site. Emergency responders need to be aware of what hazardous materials are being stored in the County.

EARTHQUAKE:

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: A Rare Event

Onset: No Warning

Hazard Duration: Less Than One Day

Recovery Time: Three Days to One Week

Impact:

- Serious Injury or Death is Likely, but not in Large Numbers
- Moderate Damage to Private Property
- Moderate Structural Damage to Public Facilities

Definition: A sudden motion of the ground caused by release of subterranean strain energy, due to plate tectonics, resulting in surface faulting (ground rupture), ground shaking, or ground failure (collapse).

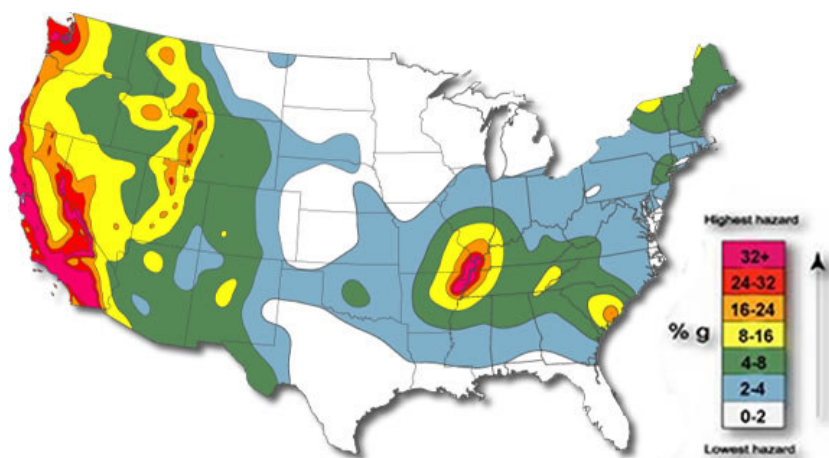
Profile/Vulnerability Assessment: There have been no recorded earthquakes with damage in Schoharie County. However, there have been earthquakes in other New York counties, some of which have been felt in Schoharie County. For example, some County residents felt a magnitude 5.3 earthquake near AuSable Forks, NY in April 2002.

An earthquake can occur anywhere in New York State; however an eastern earthquake is different than those occurring in the west. The ground motions associated with earthquakes in the eastern U.S. differ distinctly from ground motions in the western U.S. in several important ways. Eastern earthquakes tend to release higher rock stresses compared to their western counterparts, thereby causing the ground motions to contain more high-frequency energy. The ground motion shaking is felt more intensely in the eastern U.S. over larger distances because the Earth's crust and its rocks transmit seismic waves more efficiently, especially at high frequencies. This stronger shaking, especially at shorter periods and over larger distances is caused by the fact that the crustal rocks in the eastern U.S. tend to be older, more competent, and less riddled with seismically active faults.

The most seismically active regions in the New York lie in the Adirondacks and near the Canadian border along the St. Lawrence River followed by the New York City and Buffalo/Niagara/Attica regions. The possibility of a Richter magnitude 6 or greater earthquakes exists despite the fact that in the short historic record (about 300 years), no larger earthquakes have occurred in the state. Larger events have historically occurred along the Atlantic coast both north and south of New York and in adjacent Canada. The greater New York City area can expect, on average, one Richter magnitude 5 earthquake about once every 100 years (the last such event occurred in 1884).

According to the HAZNY program, in 1993 the New York State Earthquake Code Advisory Committee recommended seismic provisions for building codes in New York State. The basis for their recommendations was an assessment of the earthquake risk in New York State. The Committee divided New York State into four earthquake zones. Each zone is assigned a Peak Ground Acceleration Value. This value is the basic determinant of the earthquake risk for each county in the State. It is a measure of the horizontal force of an earthquake in terms of a percentage of gravity. Thus, it is expressed as "g" (e.g., 0.1g means 10% of gravity).

The Peak Ground Acceleration Value earthquake has a 10% probability of occurring over a 50-year period or a 100% probability over 500 years. It becomes more probable of occurring than not occurring (51% probability) over a period of 255 years. For planning purposes it is believed to be the appropriate choice for a credible worst-case event. The Peak Ground Acceleration Values range from 0.09g to 0.18g



in New York State. The higher the value, the greater the risk. . The Peak Ground Acceleration Value for Schoharie County is 0.15g. This means Schoharie County could have an earthquake with a Richter Scale magnitude of greater than 5.5, but this would be a rare event. The map at left indicates that Schoharie County is at a low risk for earthquakes. Extreme northern New York State has a higher risk. The April 2002 earthquake exceeded \$2,000,000 in damages to infrastructure and buildings. The total

structure assessed value by municipality is listed at the end of the plan by jurisdiction. It is highly unlikely that a total loss of structures would be experienced in Schoharie County, but an estimate of major earthquake damage to 20% of structures and infrastructure in the county is approximately 250 million dollars.

Earthquakes can damage buildings and infrastructure and disrupt utilities. In addition, an earthquake can trigger landslides, fire, flash floods, levee failure, dam failure, transportation accidents, and hazardous material releases. Prior to January 2003, the New York State Building Code did not address seismic design. In the current building code, structures that represent a higher hazard to human life in the event of failure must meet minimum seismic requirements. Such requirements are not necessary for most construction in Schoharie County.

FOOD SHORTAGE:

<u>Potential Impact:</u>	Throughout a Large Region
<u>Cascade Effects:</u>	Some Potential
<u>Frequency:</u>	A Rare Event
<u>Onset:</u>	Several Days Warning
<u>Hazard Duration:</u>	Two to Three Days
<u>Recovery Time:</u>	One to Two Days
<u>Impact:</u>	<ul style="list-style-type: none"> • Serious Injury or Death is Likely, but not in Large Numbers • Little or No Damage to Private Property • Little or No Structural Damage to Public Facilities

Definition: A situation where the normal distribution pattern and/or the timely delivery of foodstuffs to retail establishments for normal consumer demand is interrupted for a substantial period of time.

Profile/Vulnerability Assessment: A food shortage is most likely to occur as a result of a prolonged disruption of transportation, which could be caused by a winter storm, flood or other major event. Widespread crop failures could also contribute to a shortage of some types of food products. The probability of a prolonged or severe food shortage is considered to be low.

A food shortage is unlikely to persist long enough to cause any serious problems. Possible cascade effects could include looting and civil unrest. Although the entire population of Schoharie could be vulnerable to a food shortage, high prices for limited food supplies would be expected to have the greatest impact on low-income residents. Individuals with specific dietary requirements (such as formula-fed babies) would also be vulnerable.

EXTREME TEMPERATURES:

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: An Infrequent Event

Onset: Several Days Warning

Hazard Duration: More Than One Week

Recovery Time: Less Than One Day

Impact:

- Serious Injury or Death is Likely, but not in Large Numbers
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: Extended periods of excessive cold or hot and humid weather with a serious impact on human and/or animal populations, particularly elderly and/or persons with respiratory ailments.

Profile/Vulnerability Assessment: Extreme temperature conditions generally impact only a few isolated individuals. However, compounding circumstances, such as severe winter weather that strands motorists or an extended power failure, can increase the number of people affected. U.S. Centers for Disease Control estimates that an average of 384 people per year die from excessive heat, but few of these occur in upstate New York. Excessive heat or cold that impacts a significant portion of the population is an infrequent occurrence.

National Weather Service records for Schoharie County indicate that extreme cold (minimum temperature – 10 degrees F or below) occurred once in the twenty years from 1983 to 2003 and extreme heat (maximum temperature 100 degrees F or above) occurred once in the same period. The NWS is typically able to provide 12 to 24 hours of advanced warning for these events.

Freezing temperatures can cause problems with burst pipes, ruptured water mains, and automobiles that will not start, but the greatest danger is to people. Prolonged exposure to extreme cold can lead to frostbite, hypothermia, and death. New York statistics for deaths attributed to exposure to cold indicate that 50% are people over 60 years old, over 75% are males, and about 20% occur in the home (source: National Weather Service). If extreme cold conditions do not occur in combination with a power failure or other hazard, the greatest impact will be on low-income residents who do not have access to adequate heating. If a prolonged power outage occurs during cold weather the entire population will be impacted. Injury and deaths can result from fires or carbon monoxide poisoning that result from unsafe use of alternate sources for heating. Extreme cold can also cause damage to livestock, crops, landscaping, and other property.

There are practical problems that can result from high temperatures, such as overheated car engines, “brown-outs” from overuse of electricity for air conditioning, and changes in airplanes’ performance. However, as with extreme cold, the major danger of extreme heat is to humans and animals. Heat-related ailments can range from annoying conditions to life-threatening situations, such as heat cramps, fainting,

heat exhaustion, and heatstroke. Those most at risk are those with health conditions (respiratory ailments, overweight, alcohol problems, etc.) or those on certain medications or drugs. The people most often affected by extreme temperatures are elderly people and infants. At any one time, Schoharie County may have a few homeless people mainly in the Village of Cobleskill, who would also be vulnerable to extremely cold conditions. Low-income residents may be unable to adequately heat their homes or be in danger of carbon monoxide poisoning. Other residents who are vulnerable to extreme temperature conditions, due to limited income or health concerns, are scattered throughout the community.

Although extreme temperatures can result in serious injury or death, the number of people impacted is typically small. Frozen pipes and ruptured water mains can cause thousands of dollars in property damage.

RADIOLOGICAL (IN TRANSIT):

<u>Potential Impact:</u>	Throughout a Small Region
<u>Cascade Effects:</u>	Some Potential
<u>Frequency:</u>	A Rare Event
<u>Onset:</u>	No Warning
<u>Hazard Duration:</u>	Two to Three Days
<u>Recovery Time:</u>	Three Days to One Week
<u>Impact:</u>	
	<ul style="list-style-type: none">• Serious Injury or Death is Likely, but not in Large Numbers• Little or No Damage to Private Property• Little or No Structural Damage to Public Facilities

Definition: A release or threat of release of radioactive material from a transportation vehicle (including truck, rail, air, and marine vehicle) or other mechanism.

Profile/Vulnerability Assessment: No radiological release in transit has ever occurred in Schoharie County. The possibility of a low level release exists, especially near the I-88 corridor or along other major roads. Any storage of radioactive material in Schoharie County is in small quantities of low levels. Packing requirements for transportation of radioactive materials would most likely prevent release, even in the event of a transportation accident. If a transportation accident involving radioactive materials were to occur, unnecessary panic by residents in the immediate area would be the greatest concern. Clean up costs would most likely be small and public health would most likely not be threatened any more than natural radiation affects living things.

Hazards Rated as Low

STRUCTURAL COLLAPSE:

Potential Impact: Throughout a Large Region

Cascade Effects: Some Potential

Frequency: A Rare Event

Onset: No Warning

Hazard Duration: Less Than One Day

Recovery Time: One to Two Days

Impact:

- Serious Injury or Death is Likely, but not in Large Numbers
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: A sudden structural failing, partially or fully, of buildings, bridges or tunnels, threatening human life and health.

Profile/Vulnerability Assessment: Structural collapse in Schoharie County is usually the result of improper construction methods, improper structure maintenance, heavy snow weight, transportation accident, or fire. Barns have collapsed in the County during winter months usually due to a combination of heavy snow pack with subsequent rain. Barring collapse of a structure due to another hazard (tornado, flood, fire, explosion, etc...), the likelihood of structural collapse of residential structures or new commercial structures is low, especially with the present New York State Building Code. The collapse of a residential structure could result in approximately \$75,000 in damages per structure. Collapse of a large commercial structure or bridge could result in several hundred thousand dollars in damages. Collapse of occupied structures can result in deaths/injuries. The collapse of the I-90 Bridge in Montgomery County caused several deaths. Proper building methods and monitoring of snow load/bridge scour can help reduce this hazard.

CAVING ACCIDENT:

Potential Impact: Several Locations

Cascade Effects: Highly Unlikely

Frequency: A Rare Event

Onset: No Warning

Hazard Duration: One to Two Days

Recovery Time: Less Than One Day

Impact:

- Serious Injury or Death is Likely, but not in Large Numbers
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: An incident inside a cave requiring response by emergency personnel. Incidents can involve inability of a caver to leave a cave due to illness, broken bones, inability to move (getting stuck), or exposure to carbon monoxide or other dangerous gases that may build up in a cave.

Profile/Vulnerability Assessment: Schoharie County has over 170 caves located mainly in the northern towns of Carlisle, Cobleskill, Esperance, Schoharie, Seward, Sharon, Seward, and Wright. According to Emily Davis of the National Speleological Society, caving is not a hobby that actively seeks out more participants and should not be attempted by inexperienced and/or untrained people. In the 1960s, there were two hypothermia related cave deaths in Schoharie County. In the last 35 years, there has only been one caving death in New York State in Albany County. Two recent cave rescues in Schoharie County occurred on July 18-20, 1998 and October 7, 2001. Both incidents involved stuck cavers that required rescue personnel to enter the cave and free the accident victim. Training in cave rescues for emergency personnel is key to mitigation; however, proper education/training of the public and cavers is also essential. Locations of accessible caves are not widely distributed. Caving needs to be performed with landowner permission and proper notifications and equipment. Cave accidents, although very rare, can require considerable resources to be expended by local emergency personnel and can be quite costly. Attempts can be made for reimbursing rescuing expenses from the accident victim.

ICE JAM:

<u>Potential Impact:</u>	Several Locations
<u>Cascade Effects:</u>	Some Potential
<u>Frequency:</u>	An Infrequent Event
<u>Onset:</u>	Several Hours Warning
<u>Hazard Duration:</u>	Two to Three Days
<u>Recovery Time:</u>	Less Than One Day
<u>Impact:</u>	

- Serious Injury or Death is Unlikely
- Little or No Damage to Private Property
- Little or No Structural Damage to Public Facilities

Definition: Large accumulation of ice in rivers or streams interrupting the normal flow of water and often leading to flooding conditions and/or damage to structures.

Profile/Vulnerability Assessment: An ice jam in a river or stream effectively forms a hanging dam that can block flow and cause water to back up. The flooding caused by an ice jam will persist until the ice breaks up, either naturally or as a result of human intervention. The resulting flood damages would be localized.

Areas along streams where debris jams have developed at bridges and culverts could experience similar flooding and erosion problems due to ice jams.

Ice jam flooding in Schoharie County is not likely to impact more than a few houses. The maximum expected losses would be less than a major flood and most likely be less than \$200,000.00.

Large ice jams in Schoharie County are rare. Small ice jam flooding occurs annually along Warnerville Cut-off Road (County Route 23A) in the Town of Richmondville requiring closure of the road for several hours (pictures at left).

In March 1979, severe ice jamming caused flooding of many rivers including the Hudson, Mohawk, Susquehanna, and Chenango Rivers, as well as the Schoharie Creek, but little damage resulted.



March 2003 ice jam flood – Warnerville Cut-off Road



March 2004 ice jam – Warnerville Cut-off Road